Application of thoracic ultrasonography for the diagnosis of Bovine Respiratory Disease in Piedmontese calves

APPLICATION OF THORACIC ULTRASONOGRAPHY FOR THE DIAGNOSIS OF BOVINE RESPIRATORY DISEASE IN PIEDMONTESE CALVES

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Bovine respiratory disease (BRD) is one of the main health issues in calves. Thoracic ultrasonography (TUS) was found to be a promising tool in detecting BRD[1]. The aim of this prospective study was to describe findings of TUS, clinical examination and bacteriology in post-weaned Piedmontese calves.

Animals were examined at 3 experimental times: T0 (day of inclusion), T1 (7 days), T2 (21 days). Data about clinical examination and TUS findings (2-5 MHz convex probe) were recorded for each calf at T0, T1 and T2. TUS was performed on 4 standardized areas of both hemithoraxes: cranio-dorsal (CrD), cranio-ventral (CrV), caudo-dorsal (CaD), caudo-ventral (CaV). TUS findings were classified by mean of a scoring system (USc- 0: no lesions; 1: comet-tail artifacts; 2: lobular consolidation; 3: lobar consolidation)[1]. At T0 nasal swabs (NS) and trans-tracheal aspiration (TTA) samples were collected for bacterial culture. Data analysis [Wilcoxon signed rank test, Sensitivity (Se), Specificity (Sp)] was performed with statistical software R, v. 3.2.3. Data were reported as median (min-max), statistical significance was set at $P < 0.05$. Twenty calves, aged between 5 and 14 months, from 5 herds, were included. At T0, 14/20 (70%) animals were classified as BRD affected according to TUS findings. Only 9/20 (45%) had concomitant clinical signs. Lesions were found on both hemithoraxes in 8/14 (57%) calves and involved the CrV area in the 78% of cases. Four calves without abnormal TUS findings at T0 have developed lesions at T1 (n=3) and T2 (n=1). Median USc was 3 (0-12) at T0, 4 (0-10) at T1 and 4.5 (0-11) at T2. Statistical difference in USc was found between T0 and T2 (p=0.03). Overall, pathogenic bacteria of BRD [*Mycoplasma* spp. (56%), *P. multocida* (28%), *M. haemolytica* (11%) and *T. pyogenes* (5%)] were found in 14 TTA samples. Of these, 11 came from calves with TUS lesions at T0, while 3 were from calves that developed TUS lesions at T1 and T2. Bacterial culture of NS led to the identification of

BRD pathogens in 57% (8/14) of positive TTA samples. Clinical examination showed low sensitivity compared to both TUS (Se: 64%, Sp: 100%) and bacterial culture of TTA samples (Se: 50%, Sp: 67%). TUS had 79% of Se and 50% of Sp compared to TTA culture.

Results of the present study suggest TUS as a promising tool for the diagnosis of BRD in post-weaned Piedmontese calves. This technique can be a practical screening method in field condition, allowing the characterization of lung lesions. According to studies in dairy calves[1,2], TUS had a higher sensitivity for BRD diagnosis when compared to clinical examination. Moreover, TTA samples seems to be more appropriate than NS for bacteria detection. Our investigation led to a higher *Mycoplasma* spp. detection compared to other pathogens, showing its important role in the pathogenesis of BRD.

[1]Ollivett T.L. et al - 2016. On-Farm Use of Ultrasonography for BRD. Vet. Clin. North Am. Food Anim. Pract. 32, 19–35. [2]Buczinski S. et al - 2014. Comparison of thoracic auscultation, clinical score, and ultrasonography as indicators of BRD in preweaned dairy calves. J. Vet. Intern. Med. 28, 234–42.